

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A charging system for charging a plurality of batteries from a power source, comprising:

a primary power port configured to receive power from the power source, the primary power port being characterized by a power rating;

a plurality of secondary power ports configured to distribute power from the primary power port to the plurality of batteries, each secondary power port being characterized by a power rating, wherein the sum of the secondary power port power ratings exceeds the primary power port power rating;

one or more power converters configured to receive power from the primary power port and to provide power to the plurality of secondary power ports, the one or more power converters having a capacity to receive power from the primary power port at a level above the primary power port power rating, and

a system controller including a power controller configured to regulate the power received from the primary power port by the one or more power converters to below the primary port power rating ~~by limiting the power distributed by one or more of the secondary power ports.~~

2-12 (canceled)

13. (previously presented) The system of claim 1, with at least some of the plurality of batteries having battery controllers separate from the system controller, wherein the system controller is configured to regulate power received from the primary power port by transmitting command signals appropriate to direct the battery controllers to regulate the power drawn by their respective batteries.

14. (previously presented) The system of claim 1, wherein the system controller is configured to operate at least one secondary power port of the plurality of secondary power ports bidirectionally.

15. (previously presented) The system of claim 1, wherein the system controller is configured to operate the primary power port bidirectionally.

16. (previously presented) The system of claim 1, and further comprising a buffer battery, wherein the system controller is further configured to distribute power from the buffer battery to at least one secondary power port of the plurality of secondary power ports.

17. (previously presented) The system of claim 16, wherein:

the system controller is configured to direct power from the primary power port to the buffer battery when the power provided by the primary power port does not exceed the primary power port power rating; and

the system controller is configured to direct power from the buffer battery to the at least one secondary power port when the plurality of batteries merits a net distribution of power from the secondary power ports in excess of the primary power port power rating.

18-19 (canceled)

20. (previously presented) An electric vehicle system for use with power from a power source, comprising:

a plurality of electric vehicles, each electric vehicle having an associated battery; and
the charging system of claim 1.

21. (previously presented) The system of claim 20, and further comprising a buffer battery, wherein the system controller is further configured to distribute power from the buffer battery to at least one secondary power port of the plurality of secondary power ports.

22. (previously presented) The system of claim 20, wherein:

the system controller is configured to direct power from the primary power port to the buffer battery when the power provided by the primary power port does not exceed the primary power port power rating; and

the system controller is configured to direct power from the buffer battery to the at least one secondary power port when the plurality of batteries merits a net distribution of power from the secondary power ports in excess of the primary power port power rating.

23. (canceled)

24. (currently amended) The system of claim 1, and further comprising:

a first charging module, wherein the plurality of secondary power ports includes a first secondary power port and a second secondary power port that receive power from the primary power port via the first charging module, the first charging module including

a first power converter of the one or more power converters, the first power converter connecting to the first secondary power port,

a second power converter of the one or more power converters, the second power converter connecting to the second secondary power port,

a crossover switch switchably connecting the first power converter to the second secondary power port, and

a module controller configured to control the operation of the crossover switch and establish the power distribution between the first and second secondary power ports.

25. (canceled)

26. (original) The charging system of claim 24, wherein:

the first power converter of the first charging module connects to the first secondary power port through a first connecting switch of the first charging module;

the second power converter of the first charging module connects to the second secondary power port through a second connecting switch of the first charging module; and

the module controller of the first charging module is configured to control the operation of the first and second connecting switches and establish the power distribution between the first and second secondary power ports.

27. (canceled)

28. (previously presented) The charging system of claim 26, wherein the module controller for the first charging module is separate from the power controller, and wherein the power controller and the module controller for the first charging module communicate to determine the operation of the crossover switch and the first and second connecting switches.

29-44 (canceled)

45. (currently amended) A charging system for charging a plurality of batteries from one or more power sources, comprising:

a plurality of primary power ports configured to concurrently receive power from the one or more power sources, wherein each primary power port is characterized by a power rating;

a plurality of secondary power ports configured to distribute power from the plurality of primary power ports to the plurality of batteries, each secondary power port being characterized by a power rating, wherein the sum of the secondary power port power ratings exceeds the sum of the primary power port power ratings;

one or more power converters configured to receive power from the plurality of primary power ports and to provide power to the plurality of secondary power ports, the one or more power converters having a capacity to receive power from the plurality of primary power ports at a level above the sum of the primary power port power ratings, and

a system controller including a power controller configured to regulate the power received from the plurality of primary power ports by the one or more power converters to below the sum of the primary port power ratings by limiting the power distributed by one or more of the secondary power ports.

46. (previously presented) The system of claim 45, wherein the system controller is further configured to regulate the power received from each primary power port of the plurality of primary power ports such that the power received from each primary power port does not exceed its respective power rating.

47. (previously presented) The system of claim 45, with at least some of the plurality of batteries having battery controllers separate from the power controller, wherein the power controller is configured to regulate the power received from the plurality of primary

power ports by transmitting command signals appropriate to direct the battery controllers to regulate the power drawn by their respective batteries.

48. (previously presented) The system of claim 45, wherein the system controller is configured to operate at least one secondary power port of the plurality of secondary power ports bidirectionally.

49. (previously presented) The system of claim 45, wherein the system controller is configured to operate at least one of the plurality of primary power ports bidirectionally.

50. (previously presented) The system of claim 45, and further comprising a buffer battery, wherein the system controller is further configured to distribute power from the buffer battery to at least one secondary power port of the plurality of secondary power ports.

51. (currently amended) The system of claim 50, wherein:
the system controller is configured to direct power from the plurality of primary power ~~port~~ ports to the buffer battery when the power provided by the primary power ~~port~~ ports does not exceed the sum of the primary power port power ~~rating~~ ratings; and
the system controller is configured to direct power from the buffer battery to the at least one secondary power port when the plurality of batteries merits a net distribution of power from the secondary power ports in excess of the sum of the primary power port power ~~rating~~ ratings.

52. (previously presented) An electric vehicle system for use with power from a power source, comprising:

a plurality of electric vehicles, each electric vehicle having an associated battery;
and

the charging system of claim 45.

53. (previously presented) The system of claim 52, and further comprising a buffer battery, wherein the system controller is further configured to distribute power from the buffer battery to at least one secondary power port of the plurality of secondary power ports.

54. (currently amended) The system of claim 52, wherein:

the system controller is configured to direct power from the plurality of primary power port ports to the buffer battery when the power provided by the primary power port ports does not exceed the sum of the primary power port power rating ratings; and

the system controller is configured to direct power from the buffer battery to the at least one secondary power port when the plurality of batteries merits a net distribution of power from the secondary power ports in excess of the sum of the primary power port power rating ratings.

55. (currently amended) The system of claim 45, and further comprising:

a first charging module, wherein the plurality of secondary power ports includes a first secondary power port and a second secondary power port that receive power from the plurality of primary power ports via the first charging module, the first charging module including

a first power converter of the one or more power converters, the first power converter connecting to the first secondary power port,

a second power converter of the one or more power converters, the second power converter connecting to the second secondary power port,

a crossover switch switchably connecting the first power converter to the second secondary power port, and

a module controller configured to control the operation of the crossover switch and establish the power distribution between the first and second secondary power ports.

56. (previously presented) The charging system of claim 55, wherein:

the first power converter of the first charging module connects to the first
secondary power port through a first connecting switch of the first charging module;

the second power converter of the first charging module connects to the second
secondary power port through a second connecting switch of the first charging module;
and

the module controller of the first charging module is configured to control the
operation of the first and second connecting switches and establish the power distribution
between the first and second secondary power ports.

57. (currently amended) The charging system of claim [55] 56, wherein the module
controller for the first charging module is separate from the power controller, and wherein
the power controller and the module controller for the first charging module communicate
to determine the operation of the crossover switch and the first and second connecting
switches.

58. (canceled)

59. (previously presented) A charging system for charging a plurality of batteries
using power from a utility at a power level not exceeding a maximum power level,
comprising:

a plurality of secondary power ports, each secondary power port being configured
to electrically connect to at least one of the plurality of batteries, each secondary power
port being characterized by a power rating;

a utility port configured to electrically connect to the utility, and to provide power
from the utility to the plurality of secondary power ports;

a system controller including a power controller configured to control the power
distribution between the utility port and the plurality of secondary power ports, wherein if
the sum of the power ratings of the secondary power ports used to charge the plurality of
batteries exceeds the maximum power level, the system controller controls the power
distribution such that the plurality of batteries are simultaneously charged using power
from the utility at a power level not exceeding the maximum power level; and

a first charging module, wherein the plurality of secondary power ports includes a first secondary power port and a second secondary power port that receive power from the utility port via the first charging module, the first charging module including

a first power converter connecting to the first secondary power port,
a second power converter connecting to the second secondary power port,
a crossover switch switchably connecting the first power converter to the second secondary power port, and

a module controller configured to control the operation of the crossover switch and establish the power distribution between the first and second secondary power ports;

wherein the first power converter of the first charging module connects to the first secondary power port through a first connecting switch of the first charging module;

wherein the second power converter of the first charging module connects to the second secondary power port through a second connecting switch of the first charging module;

wherein the module controller of the first charging module is configured to control the operation of the first and second connecting switches and establish the power distribution between the first and second secondary power ports;

wherein the module controller for the first charging module is separate from the power controller; and

wherein the power controller and the module controller for the first charging module communicate to determine the operation of the crossover switch and the first and second connecting switches.

60. (previously presented) A charging system for charging a plurality of batteries using power from a utility at a power level not exceeding a maximum power level, comprising:

5 a plurality of secondary power ports, each secondary power port being configured to electrically connect to at least one of the plurality of batteries, each secondary power port being characterized by a power rating;

a utility port configured to electrically connect to the utility, and to provide power from the utility to the plurality of secondary power ports;

10 a system controller including a power controller configured to control the power distribution from the utility port; and

a first charging module, wherein the plurality of secondary power ports includes a first secondary power port and a second secondary power port that receive power from the utility port via the first charging module, the first charging module including

15 a first power converter connecting to the first secondary power port,
a second power converter connecting to the second secondary power port,
a crossover switch switchably connecting the first power converter to the second secondary power port, and

20 a module controller configured to control the operation of the crossover switch and establish the power distribution between the first and second secondary power ports;

wherein the first power converter of the first charging module connects to the first secondary power port through a first connecting switch of the first charging module;

25 wherein the second power converter of the first charging module connects to the second secondary power port through a second connecting switch of the first charging module;

wherein the module controller of the first charging module is configured to control the operation of the first and second connecting switches and establish the power distribution between the first and second secondary power ports;

30 wherein the module controller for the first charging module is separate from the power controller; and

wherein the power controller and the module controller for the first charging module communicate to determine the operation of the crossover switch and the first and second connecting switches.

61. (currently amended) A charging system for charging a plurality of batteries from a power source, comprising:

a primary power port configured to receive power from the power source, the primary power port being characterized by a power rating;

5 a plurality of power converters configured to receive power from the primary power port, the power converters having a capacity to receive power from the primary power port at a level above the primary power port power rating;

10 a plurality of secondary power ports configured to distribute power from the plurality of power converters, each secondary power port being characterized by a power rating, wherein the sum of the secondary power port power ratings exceeds the primary power port power rating; and

15 a system controller configured to regulate the power that the plurality of converters draws such that if the sum of the power ratings of the secondary power ports simultaneously used to charge batteries exceeds the primary power port power rating, the power received from the primary power port does not exceed the primary power port power rating.

62. (currently amended) A charging system for charging a plurality of batteries from a plurality of power sources, comprising:

20 a plurality of primary power port ports configured to receive power from the plurality of power sources, each primary power port being characterized by a power rating;

25 a plurality of power converters configured to receive power from the plurality of primary power ports, the power converters having a capacity to receive power from the plurality of primary power ports at a level above the sum of the primary power port power ratings;

a plurality of secondary power ports configured to distribute power from the plurality of power converters, each secondary power port being characterized by a power rating, wherein the sum of the secondary power port power ratings exceeds the sum of the primary power port power ratings; and

30 a system controller configured to regulate the power that the plurality of power converters draws such that if the sum of the power ratings of the secondary power ports simultaneously used to charge batteries exceeds the sum of the primary power port power ratings, the power received from the primary power ports does not exceed the sum of the primary power port power ratings.

63. (previously presented) The system of claim 62, wherein the system controller is further configured to regulate the power received from each primary power port of the plurality of primary power ports such that the power received from each primary power port does not exceed its respective power rating.

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